OAU-1645
Box-Seq
#3

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re United States Divisional Patent Application of:			
Applicant:	**CHILKOTI, Ashutosh**	**Atty. Docket No.**	**4176-101**
Serial No.:	**09/812,382**	**Examiner:**	
Date Filed:	**March 20, 2001**	**Group Art Unit:**	**1645**
Priority Date:	**March 20, 2000 (U.S. Provisional Application 60/190,659)**		
Title:	**FUSION PEPTIDES ISOLATABLE BY PHASE TRANSITION**		

FIRST CLASS MAIL CERTIFICATE

I hereby certify that I am mailing the attached documents to the Commissioner for Patents on the date specified, in an envelope addressed to the Commissioner for Patents, Washington, DC 20231, and First Class Mailed under the provisions of 37 CFR 1.8.

Lynda Montoya

June 1, 2001
Date of Mailing

PRELIMINARY AMENDMENT/SUBMISSION OF SEQUENCE LISTING/DISK RESPONDING TO MAY 23, 2001 NOTICE TO COMPLY, IN U.S. PATENT APPLICATION NO. 09/812,382

Commissioner for Patents
Box Patent Application
Washington, D.C. 20231

Sir:

Prior to examination of the above-identified new national phase patent application, please amend the application, as follows:

In the Specification:

1. On page 2, please replace the paragraph beginning at line 12, with the following paragraph:

ELPs, as explained more fully in the Detailed Description of the Invention hereof (Section 5) are oligomeric repeats of the pentapeptide Val-Pro-Gly-X-Gly (Sequence ID No. 1), where the guest residue X is any amino acid. ELPs undergo a reversible inverse temperature transition. They are highly soluble in water below the inverse transition temperature (T_t), but undergo a sharp (2-3°C range) phase transition when the temperature is raised above their T_t, leading to desolvation and aggregation of the polypeptide.[1, 2, 3] In previous work, McPherson et al. have exploited the inverse transition to purify recombinant poly(GVGVP) polypeptides. Previous studies have also shown that protein conjugates of poly(N-isopropylacrylamide), a synthetic polymer that undergoes a similar thermally-reversible phase transition, also retain the transition behavior of the free polymer.[5, 6, 7]

2. On page 14, please replace the paragraph beginning at line 15, with the following paragraph:

Another preferred ELP comprises polymeric units having the sequence IPGXG (Sequence ID No. 2), where X is as defined above.

3. On page 23, please replace the paragraph beginning at line 26, with the following paragraph:

The objective in this example was to design a β-turn sequence with a predicted T_t above 37°C so that an FP would remain soluble under conditions used for E. coli culture, but which could be aggregated by a small increase in temperature. Previous studies by Urry and colleagues have shown that two ELP-specific variables, guest residue(s) composition[28] (i.e., identity and mole fraction of X in the VPGXG monomer) and chain length[29] of the ELP profoundly affect the transition temperature, and thereby provide design criteria to specify the T_t for a specific application. Based on these studies, a gene was synthesized encoding an ELP sequence (Sequence ID No. 3) with guest residues valine, alanine, and glycine in the ratio 5:2:3, with a predicted T_t of ~40°C in water. The synthetic gene, which encoded 10 VPGXG pentapeptide repeats (the "10-mer"), was oligomerized up to 18 times to create a library of genes encoding ELPs with precisely-specified molecular weights (MWs) ranging from 3.9 to 70.5 kDa. To my knowledge, these are the first examples of genetically-engineered ELPs with precisely-defined chain length and amino acid sequence, which are designed to exhibit an inverse transition at a specified temperature.

Thioredoxin was expressed as a N-terminal fusion with the 10-, 20-, 30-, 60-, 90-, 120-, 150-, and 180-mer ELP sequences, and tendamistat was expressed as a C-terminal fusion to thioredoxin/90-mer ELP (Figure 1b).

4. On page 32, please replace the paragraph beginning at line 21, with the following paragraph:

Standard molecular biology protocols were used for synthesis and oligomerization of the ELP genes (Ausubel, et al.[32]). Monomer genes for two ELP sequences were utilized in this example. The first, ELP[$V_5A_2G_3$-10] encoding ten Val-Pro-Gly-Xaa-Gly repeats where Xaa was Val, Ala, and Gly in a 5:2:3 ratio, respectively, had been synthesized previously[37]. The second monomer, ELP[V-5] (Sequence ID No. 4), encoded five Val-Pro-Gly-Val-Gly pentapeptides (i.e., Xaa was exclusively Val). The coding sequence for the ELP[V-5] monomer gene was: 5'-GTGGGTGTTCCGGGCGTAGGTGTCCCAGGTGTGGGCGTACCGGGCGTTGGTGTTCCTG GTGTCGGCGTGCCGGGC-3' (Sequence ID No. 5). The monomer genes were assembled from chemically synthesized, 5'-phosphorylated oligonucleotides (Integrated DNA Technologies, Coralville, IA), and ligated into a pUC19-based cloning vector. A detailed description of the monomer gene synthesis is presented elsewhere[38].

5. On page 33, please replace the paragraph beginning at line 11, with the following paragraph:

Different ELP constructs are distinguished here using the notation ELP[X_iY_j-n], where the bracketed capital letters are single letter amino acid codes and their corresponding subscripts designate the frequency of each guest residue in the repeat unit, and n describes the total length of the ELP in number of pentapeptides. The two ELP constructs central to the present example are ELP[$V_5A_2G_3$-90] (35.9 kDa) (Sequence ID No. 6) and ELP[V-20] (9.0 kDa) (Sequence ID No. 7).

REMARKS

Applicant has received a Notice to Comply with Requirements for Patent Applications Containing Nucleotide Sequence and/or Amino Acid Sequence Disclosures dated May 23, 2001 from the Patent and Trademark Office, requiring applicant to provide an initial computer readable form copy of the "Sequence Listing" and an initial paper copy of the "Sequence Listing", as well as an amendment directing its entry into the application.

In response, applicant has amended the specification of the instant application to identify each sequence to be included in the concurrently submitted "Sequence Listing" with a Sequence ID No.

Such amendment does not constitute new matter, and applicant respectfully requests the Office to proceed with further examination on the basis of such amendment.

Respectfully submitted,

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Registration No. (see attached)

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BEFORE THE OFFICE OF ENROLLMENT AND DISCIPLINE
UNITED STATE PATENT AND TRADEMARK OFFICE

LIMITED RECOGNITION UNDER 37 CFR § 10.9(b)

Yongzhi Yang is hereby given limited recognition under 37 CFR § 10.9(b) as a student trainee at Intellectual Property Technology Law ("IPTL") to prepare and prosecute patent applications in the United States Patent and Trademark Office wherein the applicant is a client of IPTL and the attorney or agent of record in the application is an employee of IPTL. This limited recognition shall expire on the date appearing below, or when whichever of the following events first occurs prior to the date appearing below: (i) Yongzhi Yang ceases to lawfully reside in the United States, (ii) Yongzhi Yang's training at IPTL ceases or is terminated, or (iii) Yongzhi Yang ceases to remain or reside in the United States on an F-1 visa.

This document constitutes proof of such recognition. The original of this document is on file in the Office of Enrollment and Discipline of the United States Patent and Trademark Office.

Expires: June 30, 2001

Harry I. Moatz
Director of Enrollment and Discipline

APPENDIX A

Version with Markings to Show Changes Made

In the Specification:

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